Thomas Walker makes mention of a condition of an intermediary cavity between the intestines and bladder, which could accumulate pus and feces and later discharge into the bladder through a direct or tortuous sinus.

The symptoms of fistula in the bladder are identical with those of an irritable bladder, associated with an acute bacteriological cystitis; diuria, nocturia, with much tenesmus, and the addition of gas and feces in the urine being particularly noticeable. Air in the bladder is sometimes present without a fistulous tract in the bowel. Dittel, Hartman and Blanquinque have all reported cases of this kind, which may be termed: essential gas formation in the bladder.

The onset may be insidious, whence there are apt to be symptoms attributable to rectal or bowel trouble, such as diarrhoea, flatus, blood in the stools, dribbling of urine into the rectum and pain principally in the anus. The bladder symptoms in these cases come on gradually. The case here reported is not of this insiduous type, the onset being sudden and not gradual.

*Treatment:* The treatment resolves itself into those cases that can be treated by the administration of specific remedies, especially, where one has a specific disease, as the etiological factor. Syphilis and tuberculosis should be handled with our modern remedies. The bladder should be frequently irrigated with some antiseptic solution and as often as necessary to keep the bladder fluid comparatively clear. Urinary antiseptics should be given internally and careful attention should be given to the bowels and to the diet. In one of the above cases reported by Cunningham, a tubercular patient, the fistula was healed by strict attention to diet, hygienic measures and bladder irrigations. This patient died a number of years later from a general tuberculosis. Thomas Walker states that he has seen patients in good health twenty years after the fistula had become established. Tuttle states that in acute cases due to accident, injuries, surgical procedures, permanent catheterization together with constipation of bowels may facilitate the healing.

The permanent cure of these patients resolves itself into some form of surgical procedure, either a direct closure of the fistulous tract or the diversion of the fecal stream.

A colostomy is the operation of choice, when the fistula empties into the rectum; but where the communication between the intestine and bladder is above the sigmoid, it is not likely to prove satisfactory, and the surgical procedure would be to open the abdomen, dissect the intestines free from the bladder and repair both organs where possible, and if necessary do a resection of the gut. From inquiries, as well as perusal of the literature, I find the mortality in the latter type of cases to be very high.

In 1911, Dr. A. L. Chute of Boston reported two fatal cases of intestinal vesicle fistula, due to diverticulitis of the sigmoid, both of which died following operation. In these cases the sigmoid was found adherent to the bladder, with a large amount of adhesions being present.

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## URETERAL TRANSPLANTS FOR OBSTRUCTION OF THE LOWER URETER.*

By ROBT. V. DAY, M. D., Los Angeles.

I wish to report a small series of ureteral transplantations in the skin of the abdomen. The indications, and especially the technique and results, of bowel and bladder transplants, so comprehensively taken up by the Mayos, Coffey, Stiles and many others that I wish to confine myself to the comparatively neglected field of ureter to skin anastomosis.

There are three types of cases in which this is applicable and preferable:

*First and most important:* In cases of advanced and incurable tuberculous bladder with intractable vesical symptoms, where both kidneys are tuberculous, or in case of a previous nephrectomy on one side, the other side has become so involved that an exquisitely irritable contracted viscus exists which is not or cannot be palliated by suprapubic drainage.

*Second:* In lieu of nephrectomy, where there exists trauma and infection on one side and there is doubt for the time being as to the future functional efficiency of the opposite side as illustrated later by Case V.

*Third:* In carcinomatous infiltration in the walls and about the lower ureter in carcinoma of the cervix causing extreme obstruction or occlusion;

In carcinoma of the bladder—male or female—in which the bladder has become highly contracted and so irritable that suprapubic drainage is no longer tolerable.

CASE I.

Male, aet. sixty, carcinoma of bladder, Squien's Radical operation done one year before; four months previously we opened and cauterized by Percy method; permanent suprapubic drainage instituted; condition at this time intolerable. Bilateral ureteral anastomosis in the bowel because his days were numbered and he begged to have an operation to sidetrack the urine and would not tolerate the idea of having the ureters transplanted three weeks apart since his bladder tenesmus would not be relieved whatever by the first operation. Both ureters were infiltrated at the lower ends—both dilated—one as large as a lead pencil, the other as large as a man's finger. His kidney function was bad and he died of uremia nine days after the operation. I report this case of ureto-sigmoidal transplant as a contrast to the others to follow of skin transplants, all of whom were in quite as bad or worse general condition. In old cases with highly damaged kidneys from back pressure ascending infection is almost certain to follow if they do not die from uremia or other causes very soon, where the bowel transplant is done. The man was entirely relieved, however, of his bladder symptoms at once. He had it impressed upon him that the operation would probably result fatally, but he chose it himself. What pain he had incidental to the belly operation was negligible compared to his previous pain. There was considerable rectal irritation from the purulent urine direct from the kidneys, producing a mild proctitis, but relieved by a soft Pezzer catheter in the rectum, draining the urine as fast as it entered. From this one readily deduces that the bowel transplant is

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not a suitable palliative operation in any sense for these advanced and intractable cases.

CASE II.

A negro woman, aet. 39, hysterectomy three years previously for uterine fibroid. In county hospital for past four months with carcinoma of the cervix, with extensive infiltration in the base of the bladder and vaginal walls. The nurse reported she had urinated but a few ounces in four days. Bladder catheterization disclosed a practically empty bladder. The right ureter was catheterized, but no catheter could be inserted into the left. A number 7 whistle-tipped catheter was left high up on the right side and uretero-dermal anastomosis made on the left. The abdominal muscles highly oedematous as disclosed at the operation, and leaked serum very freely. A number 14 soft rubber catheter was passed into the hook-up ureter and a weak argyrol irrigation made twice daily. At the end of a week the catheter in the right side was removed, judging that the prolonged dilatation would so modify the obstruction that the urine would pass. However, at the end of 24 hours there was no urine in the bladder and consequently another catheter was inserted into the right pelvis. She developed an intense pyelitis in the right side six days later. The right ureter was therefore transplanted and argyrol irrigations commenced. Both pelves in this case had undergone considerable dilatation and were filled with a creamy fluid—urine and pus. Parenthetically, it was amazing to observe the promptness with which these severe cases of pyelitis—some of them with profound constitutional symptoms—cleared up. To this there were practically no exceptions in ony of the cases. She died of her original disease (diffuse carcinomatous infiltration throughout the pelvic organs) about two months later, after having been removed to the contagious pavilion, it having been found that she was a diphtheria carrier.

CASE III.

A Japanese, aet. 45, history of four operations for carcinoma of bladder. First one radical; last previous operation disclosed metastasis in the retro-peritoneal glands and omentum as large as a small English walnut. Suprapubic drainage had worn itself out and the patient having known of the relief afforded another patient in the ward about that time, pleaded to be hooked up so that he could obtain sufficient relief to get back to Japan and die in his own country—a Japanese custom. He had had at the time of transplant operation practically complete anuria for three days, and his abdominal wall was found very oedematous and his ureter greatly dilated. An assistant tore his left ureter so high up that a nephrectomy would later become necessary on that side and a transplant on the other. Both sides drained abundantly for two weeks and his condition was splendid when suddenly he developed acute surgical condition in the lower pole of the left kidney whose ureter was injured and he had anuria on that side. A left nephrectomy was done and he made an uneventful recovery. His other kidney, after hooking up, put up a high percentage of 'phthalein and the urine was clear up to the time of his death nine weeks after the left nephrectomy.

CASE IV.

A Mexican woman, aet. 46, carcinoma of cervix. Percy's cautery method had been used and following this she developed a vesico-vaginal fistula from the burn. Some time later she was presented, along with other cases, of carcinoma, for operation at a clinic arranged for Dr. Percy at the Los Angeles County Hospital. Dr. Percy, after entering the abdomen, found a large dilated left ureter from which he aspirated some exceedingly purulent urine and at that time advised that her left kidney be removed at a later date. The ammoniacal urine leaking through the vesico-vaginal fistula had, in spite of all attempts to obviate it, resulted in marked dermatitis and extreme excoriation of her skin. Her condition was pitiful and one heard her moans down the hall long before he came to her room. One thing she begged for, next to a speedy death, was relief from the incontinence and excruciating dermatitis therefrom. We decided that a less dangerous and more palliative operation would be skin transplants or both ureters, a conclusion Dr. Percy himself commended when it was told him. The head nurse in the Surgery looked the woman over a bit and chided us for having the temerity to operate on this frail, emaciated, weak woman, venturing a bet, which was accepted, that she would die on the table. Dr. Mulvehill and I simultaneously transplanted the right and left ureters and she lived several weeks thereafter in comparative comfort.

CASE V.

Mrs. E. W., aet. 43, papillomatous cyst of the ovary with massive abdomen. A portion of the left ureter about one inch long was found to have been removed with cystic tumor and an anastomosis of the cut ends of the severed ureter was immediately done. Nearly three weeks after this abdominal operation I was notified by the interne that he had in his ward a case for nephrectomy. She had been draining urine through the abdominal incision for two weeks or more and was desperately ill—high fever, rapid pulse, high leukocytic count, etc. I instructed him to do a functional kidney test which obviously would be only for that side on which the ureter was uninjured, namely, the right. During the first hour 4% of 'phthalein came through; during the second hour, 5%; obviously the kidney whose ureter was uninjured was functioning so poorly at that particular time, at any rate, that it would not alone sufficiently serve the patient as a kidney filter. What amount of dye the other kidney was putting out we have no means of knowing, since by a tortuous course the urine was being discharged on the abdominal dressing. It was decided to hook up the left ureter to the skin, and if at a later time when she recovered from her sepsis, the other kidney should "come back," a nephrectomy could then be done safely. Consequently this was done. An extra-peritoneal abscess along the pelvic wall was encountered and drained of perhaps eight ounces of pus. The end of the ureter was difficult to find without injury to the intestines and had to be followed down from above. She made an uneventful recovery, gained weight rapidly and went home. On February 9th, ten weeks after the anastomosis, she was sent for and a functional kidney test was made. Her bladder was catheterized and the urine obtained contained considerable albumen, cast and occasional pus cell. 'Phthalein appeared in the bladder urine 22 minutes after intravenous injection and in the succeeding half hour (52 minutes altogether from the time of injection) there was 5½%. The dye appeared from the hooked up ureter in five minutes and in the succeeding half hour the output was 15%—in other words—15% in 35 minutes from the hooked up ureter as against 5½% from the other side in 52 minutes. We therefore conclude that a nephrectomy would have resulted in death from uremia in from one to two weeks in her case and we had saved her life by a transplant.

The technique is simple. If the ureter is very short it is brought out high up. Perhaps the best insertion is one through the outer third of the rectus sheath or through the semilunar line. We have tried Semi-Pfannenstiel, muscle-splitting, etc., but they are not quite so easy as the before mentioned. It makes little difference whether the bucous membrane is tacked to the skin or a good long piece of the ureter left protruding. We have had success both ways. In either event the ureteral wall is tacked to the aponeurosis or fascia and is left protruding to the skin and a catheter inserted to the kidney pelvis fastened in place.

The catheter is changed daily and through it the pelvis is injected with weak argyrol solution. We prefer bringing out the ureter through a stab near the incision, but we do not always do this. Cigarette drainage behind the peritoneum is necessary as a small hematoma—sure to get infected—is likely to result from the oozing. In certain advanced tuberculous bladder it is not only an act of mercy, but often prolongs life very markedly with immediate relief from the bladder symptoms. Bowel transplants are quite out of the question here, since infection will certainly take place in the gut; for this it is the operation par excellence. I have not yet performed it for this, but I have followed very closely two cases done by my colleague, Dr. Rosecranz, and cannot speak too highly of the procedure in these cases—one now having been done fourteen months—after a history of renal tuberculosis for ten years with a left nephrectomy double tuberculosis epididymis with rupture and prolonged drainage, tuberculous fistula, in ano, and the morphine habit, who has been four months conducting his own chicken ranch in Michigan after an invalidism to my knowledge of five years.

CONCLUSION:

Ureteral transplants to the skin is an act of mercy in certain advanced cases of bladder carcinoma. It is all of that in some cases of bladder tuberculosis and here markedly prolongs life and lessens invalidism. It prolongs life in certain cases of carcinomatous invasion from adiacent extra urinary organs. It saves life as illustrated by Case V. Unlike any other anastomosis of the ureter, the kidney is not insulted in the slightest and drainage can be made perfect. Even bilateral anastomosis to the skin at one sitting is almost devoid of shock in the feeble. It is the most rapid and efficient method of treating pyelitis and restoring kidney function to the maximum.

## THE SIGNIFICANCE OF SPINAL DEFECTS AND PAIN OCCURRING IN RELATION TO OCULAR DISEASE.*

By LLOYD MILLS, M. D., F. R. C. S., Los Angeles.
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The loss of active interest in any possible relations between the eyes and the structures of the neck, followed the meteoric vogue of operations upon the cervical sympathetic ganglia, in a manner comparable to the operative blight which succeeded the period of complete tenotomies for strabismus.

Many clearly established facts and daily clinical observations attest, however, the continuous activity and importance of the oculo-cervical relations. As early as 1727, according to de Schweinitz,[1] Pourfour de Petit observed that the eye became softer after section of the cervical sympathetic. Verification of this fact led to the belief that "primary disease of the cervical sympathetic ganglia might be the basal cause of glaucoma." The pressure of cervical tumors, of mediastinal polyadenitis, and of fracture-dislocations of the cervical vertebrae, notably of military origin, gave further striking evidence of the effects of deviation of normal sympathetic control over the eyes.

The sympathetic system correlates the various activities of the viscera, the inclusion of the eyes in the visceral chain being shown by the dramatic ophthalmo-cardiac reflex and its modifications in disease. This correlation is shown more commonly and constantly by the pupillary changes common to the states of fear and excessive emotion, the ocular changes being linked with complete inhibition of the whole digestive function, with increase in the rapidity of the cardiac and respiratory action, with sudden activation of the suprarenals and thyroid and the immediate conversion of the sugar reserves stored in the liver and the body in general, into the final defense expression of more intense muscular activity.

The results of the excision of the superior cervical ganglion in glaucoma, as collected by Wilder[2] and by Rohmer,[3] show this operation to have been followed by improvement in from 40% to 70% of the cases operated upon. Further tribute to the relations in question and to the operation of sympathectomy as well, was paid in Axenfeld's statement that "there is obtained by this operation in a certain proportion of cases of simple glaucoma, a definite and important result, and in some instances there has been a decided improvement, even where a previous iridectomy has failed." A low but constant mortality, the occasional development of tachycardia, exophthalmus, and ptosis and the opposition of the German school led to the abandonment of the operation and to forgetfulness of the significance of the benefits obtained in the successful cases. Two deductions might have been drawn from these cases: First, that a constant irritation in the form of pressure in the intervertebral foramina, or drag or pressure upon the sympathetic chain in its course, may have provoked the iridic and choroidal vasomotor changes which are expressed in the symptoms of glaucoma; second, that such prolonged pressure and irritation may have set up the degenerative changes in the sympathetic nerves and ganglia noted by Fisch,[4] Cutler and Gibson,[5] Wilder[6] and Weeks,[7] changes which were but little affected, if at all, by division or excision of a fragment of degenerated nerve at a relatively low nerve level. The successful results which followed the drastic removal of the ciliary ganglion in absolute glaucoma by Rohmer, and by Terrien and Poirson support the latter idea. Such deductions explain the recurrences noted after sympathectomy and after other operative measures for the relief of high intraocular tension.

The cervico-thoracic spine, as we have shown elsewhere,[8] is peculiarly subject to skeletal anomaly, to articular disease and to the effects of spinal distorsions. The existence of these abnormal factors, appearing, together with marked contractures or painful spasm of the cervical muscles, with significant regularity in many cases of glaucoma and in some of the obscurer cases of chronic non-inflammatory congestion of the conjunctivae, lend decided weight to the previous deductions.

Ocular vascular tone and its obvious expression as tone of the iris are clearly related to the state of activity of the sympathetic system in general. Postural strain may disturb the cervical sympathetic directly, or reflexly through fibers

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